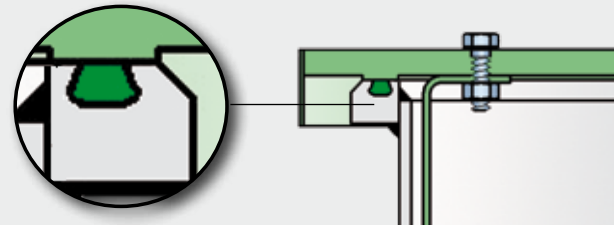


## Self Closing Emergency Pressure Relief Valve

**Start to cut costs and losses and help to protect the environment!**

- **10% Full Lift Type Technology**
- **Leake Rate**



### Applications

Pressure relief valves PROTEGO® ER/V are generally used as so-called Emergency Relief Valves for tanks in compliance with Annex L of the European Standard EN 14015 or the American Standard API 2000 for fire condition. To meet the goal of emission reduction, PROTEGO® full lift vents utilize 10% overpressure technology. An additional design advantage to the „Full lift type“ technology is the higher flexibility in setting the vent closer to the design pressure of the tank. Setting the emergency relief valve higher also allow to increase the set pressure of the 10% full lift type conservation vent. Using both technologies in combination results in maximum vapor saving potential.

### Benefits

- excellent tightness is achieved by valve seats made of stainless steel with a precisely lapped valve pallet and an inserted o-ring seal hence least possible product losses and reduced environmental pollution
- “full lift type” technology valve utilizes only 10% overpressure to reach full lift
- high mechanical and dynamical stability by robust housing
- the set pressure is close to the opening pressure which results in best possible pressure management of the system
- self closing safely secured valve pallet
- high flow capacity by large opening (DN200/8“ up to DN700/28“)
- Pressure Settings  
DN 200/8“ to DN 350/14“: +5 mbar up to +40 mbar  
DN 400/16“ to DN 700/28“: +5 mbar up to +25 mbar
- higher pressures are achieved with levers up to 60 mbar(ER/VH) or with spring loading up to 500 mbar (ER/V-F)



ER/V-F without weather hood.





## The quality and the know-how of PROTEGO® are worth it!

### Example for tank design according to EN 14015 / API 650

#### PROTEGO® 10% full lift type technology

For the PROTEGO® emergency relief valve (ER/V) a tank design pressure of 20 mbarg results in a set pressure of 18 mbarg due to the 10% technology.

By comparison a common emergency pressure relief valve already opens at 10 mbarg.

The 10% technology for an ER/V is an advantage because the set pressure of the breather valve can also be increased. Hence, vapor losses are reduced to an absolute minimum.

#### PROTEGO® Standard for measuring leakage rates

The leakage rates depend on the size of the device (table 1).

Depending on the set pressure the leakage rates are measured at a test pressure 75%, 80%, 85% and 90% of the set pressure (table 2).

According to standard ISO 28300 and API 2000 6th Edition the measured leak rate shall be less than the value specified in table 3 at 75% of the adjusted set pressure.

nominal width DN		admissible leakage rate			test time
[mm / inches]		[bubbles/min]	[cm³/min]	[m³/h]	[min]
over	up to				
150	200	125	37,5	0,002250	2
200	250	157	47,1	0,002826	2
250	300	188	50,4	0,003024	2
300	350	220	66,0	0,003960	2
350	400	252	75,6	0,004536	2
<b>400</b>	<b>500</b>	<b>314</b>	<b>94,2</b>	<b>0,005652</b>	<b>2</b>
500	600	376	112,8	0,006768	2
600	700	440	132,4	0,007944	2

table 1: admissible leakage rates according to the normal PROTEGO® standard



Figure X3: PROTEGO® Vent Valve „Bubble“ Testing

### Example for leakage rates according to the PROTEGO® standard and API 2000 6th Edition

According to the PROTEGO® standard for a PROTEGO® ER/V size DN 500/20“ and a set pressure of 18 mbarg a leakage rate of 0,005652 m³/h (94,2 cm³/min) at 85% of the set pressure (15,3 mbarg) is achieved.

By comparison according to API 2000 6th Edition 0,5663 m³/h (9438,3 cm³/min) at a design pressure of 75% (13,5 mbarg) are allowed.

At a higher design pressure the leakage rate of PROTEGO® is far below the API Standard and complies with the toughest environmental requirements.

adjusted set pressure [mbar]		test pressure as percentage of adjusted set pressure [%]
over	up to	
	5	75
5	10	80
<b>10</b>	<b>20</b>	<b>85</b>
20	-	90

table 2: test pressure is a function of the adjusted set pressures according to the normal PROTEGO® standard

vent size	maximum allowable leak rate
[mm/inches]	[m³/h] (CFH)
≤ 150/6	0,0142 (0,5)
200/8 to 400/16	0,1416 (5,0)
<b>&gt; 400/16</b>	<b>0,5663 (20,0)</b>

table 3: maximum allowable leak rate according API 2000<sup>6th</sup> Edition

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for safety and environment